CLAIMS:

1. A light-emitting field-effect transistor including an organic semiconductive layer having an electron affinity $EA_{semicond}$; and an organic gate dielectric layer forming an interface with the semiconductive layer; characterised in that the bulk concentration of trapping groups in the gate dielectric layer is less than $10^{18}cm^{-3}$, where a trapping group is a group having (i) an electron affinity EA_x greater than or equal to $EA_{semicond}$ and/or (ii) a reactive electron affinity EA_{rxn} greater than or equal to ($EA_{semicond.}$-2eV), that is capable of emitting light when operated in a biasing regime in which negative electrons are injected from an electron-injecting electrode into the organic semiconductive layer, and positive holes are injected from a hole-injecting electrode into the organic semiconductive layer.

2. A light-emitting transistor according to claim 1, wherein the transistor is an ambipolar field-effect transistor.

3. A light-emitting transistor according to any one of the preceding claims wherein $EA_{semicond.}$ is greater than or equal to 2eV.

4. A light-emitting transistor according to claim 3 wherein $EA_{semicond.}$ is in the range of from 2eV to 4eV.

5. A light-emitting transistor according to any one of the preceding claims wherein the gate dielectric layer comprises an organic insulating material and the organic insulating

material does not contain a repeat unit or residue unit comprising a trapping group.

6. A light-emitting transistor according to any one of the preceding claims, wherein the insulating material does not contain a repeat unit or residue unit comprising a group having (i) an electron affinity EA_x greater than or equal to 3eV and/or (ii) a reactive electron affinity EA_{rxn} greater than or equal to 0.5eV.

7. A light-emitting transistor according to claim 6 wherein the insulating material does not contain a repeat unit or residue unit comprising a quinone, aromatic -OH, aliphatic -COOH, aromatic -SH, or aromatic -COOH group.

8. A light-emitting transistor according to any one of the preceding claims, wherein the insulating material contains one or more groups selected from alkene, alkylene, cycloalkene, cycloalkylene, siloxane, ether oxygen, alkyl, cycloalkyl, phenyl, and phenylene groups.

9. A light-emitting transistor according to any one of claims 5 to 8 wherein the insulating material comprises an insulating polymer.

10. A light-emitting transistor according to claim 9, wherein the insulating polymer is selected from the group consisting of substituted and unsubstituted poly(siloxanes) and copolymers thereof; substituted and unsubstituted poly(alkenes) and copolymers thereof; substituted and unsubstituted poly(styrenes) and copolymers thereof; and

substituted and unsubstituted poly(oxyalkylenes) and copolymers thereof.

11. A light-emitting transistor according to claim 10, wherein the backbone of the insulating polymer comprises a repeat unit comprising $-Si(R)_2-O-Si(R)_2-$ where each R independently is methyl or substituted or unsubstituted phenyl.

12. A light-emitting transistor according to any one of claims 9 to 11, wherein the insulating polymer is crosslinked.

13. A light-emitting transistor according to any one of the preceding claims wherein the organic semiconductive layer comprises a semiconductive polymer.

14. A light-emitting transistor according to any one of claims 1 to 12 wherein the organic semiconductive layer comprises a semiconductive oligomer.

15. A light-emitting transistor according to any one of claims 1 to 12 wherein the organic semiconductive layer comprises a semiconductive small molecule.

16. A light-emitting transistor according to any preceding claim wherein said electron injecting electrode is made from a different material than said hole injecting electrode.

17. A light-emitting transistor according to any of claims 1 to 15 wherein said electron injecting electrode is made from the same material as said hole injecting electrode.

18. A light-emitting transistor according to any of claims 1 to 15, wherein the surface of said electron injecting electrode that is in contact with the organic semiconductive layer has a different surface composition than the surface of said hole injecting electrode in contact with the organic semiconductive layer.

19. A light-emitting transistor according to any preceding claim wherein said electron injecting and hole injecting electrodes have different workfunctions.

20. A light-emitting transistor according to claim 19, wherein the workfunction of the hole injecting electrode is larger by more than 0.5 eV than that of the electron injecting electrode.

21. A light-emitting transistor according to claim 19, wherein the workfunction of the hole injecting electrode is larger by more than 1.5 eV than that of the electron injecting electrode.

22. An ambipolar, light-emitting transistor comprising an organic semiconductive layer in contact with an electron injecting electrode and a hole injecting electrode separated by a distance L defining the channel length of the transistor, in which the zone of the organic semiconductive layer from which the light is emitted is located more than L/10 away from both the electron as well as the hole injecting electrode.

23. An ambipolar, light-emitting transistor comprising an organic semiconductive layer in contact with an electron injecting electrode and a hole injecting electrode, in which the zone of the organic semiconductive layer from which the light is emitted is located more than 1 μm away from both the electron as well as the hole injecting electrode.

24. An ambipolar, light-emitting transistor comprising an organic semiconductive layer in contact with an electron injecting electrode and a hole injecting electrode, in which the zone of the organic semiconductive layer from which the light is emitted is located more than 5 μm away from both the electron as well as the hole injecting electrode.

25. An ambipolar, light-emitting transistor as claimed in any of claims 22 to 24, comprising an organic gate dielectric layer forming an interface with the organic semiconductive layer, characterised in that the bulk concentration of trapping groups in the gate dielectric layer is less than $10^{18}cm^{-3}$, where a trapping group is a group having (i) an electron affinity EA_x greater than or equal to $EA_{semicond}$ and/or (ii) a reactive electron affinity EA_{rxn} greater than or equal to ($EA_{semicond.}$-2eV).

26. A method for biasing a light-emitting transistor as defined in any preceding claim, wherein the bias voltage applied to a control gate electrode of the transistor is selected to be in between the bias voltage applied to the hole injecting electrode and that applied to the electron injecting electrode.

27. A method for operating a light-emitting transistor according to any preceding claim, wherein the bias voltage applied to a control gate electrode, the bias voltage applied to the hole injecting electrode, and the electron injecting electrode are adjusted to move the recombination zone to a desired position along the channel of the transistor.

28. A method for making a light-emitting transistor as defined in any one of claims 1 to 25.

29. A method as claimed in claim 28, wherein the step of defining said electron-injecting and hole-injecting electrodes comprise shadow-mask evaporation.

30. A method as claimed in claim 28, wherein the step of defining said electron-injecting and hole-injecting electrodes comprise surface-energy assisted printing.

31. A method as claimed in claim 28, wherein the step of defining said electron-injecting and hole-injecting electrodes comprise self-aligned printing.

32. A method as claimed in claim 28, wherein the step of defining said electron-injecting and hole-injecting electrodes comprise evaporation at an oblique angle.

33. A method as claimed in claim 28, wherein the step of defining said electron-injecting and hole-injecting electrodes comprise underetching of a metal film protected by a resist pattern.

34. Use of a light-emitting transistor according to any of claims 1 to 25 as dependent on claim 2 for light-emission in a transistor.

35. A circuit, complementary circuit, logic circuit or a display including a light-emitting transistor as defined in any one of claims 1 to 25.

36. A method for making a circuit, complementary circuit, or logic circuit as defined in claim 35.